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THE OLDEST DERMESTID BEETLE FROM THE MIDDLE JURASSIC OF CHINA (COLEOPTERA: DERMESTIDAE)

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Abstract.— *Paradermestes jurassicus* gen. et **sp. nov.**, a new dermestid beetle is described based on a well-preserved impression fossil collected from the Middle Jurassic Jiulongshan Formation in Daohugou Village, Shantou Township, Ningcheng County, Inner Mongolia, China, making it the oldest fossil of the family. Based on its size, no visible ocellus and laterally reduced hind coxal plates *Paradermestes* is placed in subfamily Dermestinae and tribe Paradermestini, trib. nov.

Key words.— Coleoptera, Dermestidae, beetles, insect fossil, new taxa, Middle Jurassic, Daohugou, China.

INTRODUCTION

Dermestidae, is small cosmopolitan family of bostrichiform beetles with about 60 genera and 1500 species (Háva 2015). The family includes several economically important pests of stored products and other commodities, globally distributed with human settlements and a commerce. Dermestidae species are relatively well known in most of the biogeographic regions but new genera and species have been constantly described at a quite high pace in the last 10–15 years (Háva 2015). Zhantiev (2000), Lawrence and Ślipiński (2005) and Kiselyova and McHugh (2006) investigated tribal/subfamily level relationships of Dermestidae based on adult and larval characters recognising six subfamilies, Dermestinae, Attageninae, Megatominae, Orphilinae and Trinodinae and Thorictinae (Lawrence and Ślipiński, 2010; Háva, 2015).

Fossil taxa classified in Dermestidae are known mostly from the Cenozoic Baltic and Dominican amber deposits (see summary in Háva 2015 and in Cai *et al.* 2016) with only few Cretaceous amber inclusions described so far (Cockerell 1917, Kirejtshuk *et al.* 2009; Peris and Háva 2016 and Cai *et al.* 2016).

Recently, during sorting various fossils at the Capital Normal University, we have discovered very well-preserved impression fossil of Dermestidae from the Jiulongshan Formation in Daohugou Village, Inner Mongolia, China. The Jiulongshan Formation has a lithology of grey, greenish and purplish tinged, fine-grained sandstones and volcanic tuffs that are intercalated with taupe coloured conglomerates and brick-red mudstones. The formation ranges from 50 to 80 meters

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in thickness and yields abundant fossil insects (Wang *et al*. 2010, 2012, Ren *et al*. 2009, Gu *et al*. 2012, Yang *et al*. 2014). Geological studies emphasizing stratigraphic correlations from measured data strongly indicate that the Daohugou strata belong to the Jiulongshan Formation (Ren *et al*. 2002, 2010, Chen *et al*. 2004). The discovery of this fossil specimen in the Middle Jurassic (about 165 Mya) is the first record from the Jiulongshan Formation, and the earliest fossils of the family.

Material and methods

The specimen was examined using a Leica MZ20.5 dissecting microscope and illustrated with the aid of a drawing tube attachment. Digital photographs taken with a Nikon Digital camera and line drawings were enhanced in Adobe Photoshop CS graphic software. The morphological terminology of Dermestidae employed here is largely based on that of Lawrence and Ślipiński (2010), and the higher classification of Dermestidae is that of Lawrence and Ślipiński (2005, 2010) and Háva (2015).

Measurements (in mm) were taken as follows: length: from apical margin of clypeus to elytra; head length: along mid-line from anterior margin of clypeus to line connecting posterior margins of eyes; head width: across maximum width (including eyes); pronotal length: along mid line from anterior to posterior margin; pronotal width: across maximum width; elytral length: along suture, including scutellum; elytral width: across maximum combined width.

Taxonomy

Family Dermestidae Latreille, 1804

Subfamily Dermestinae Laterille, 1804

Tribe **Paradermestini** trib. nov.

Type genus. *Paradermestes* gen. nov.

Diagnosis. *Paradermestes* represents the first Jurassic member of the family Dermestidae, distinguished from all known recent and fossil genera of Dermestidae by its broadly oval body combined with the lack of the median ocellus, 11-segmented antenna with 4-segmented antennal club, the hind coxae bearing only mesally developed plates and extending laterally beyond metaventrite to elytral epipleura. *Paradermestes* (Paradermestini) differs from the genera classified in Dermestini or Marioutini in the subfamily Dermestinae by broadly oval shape, 11-segmented antenna with 4-segmented club, and procoxae not projecting and separated by a complete prosternal process.

Paradermestes gen. nov.
(Fig. 1)

Type species. *Paradermestes jurassicus* sp. nov.

Etymology. The generic name is a combination of the prefix Para- and the generic name *Dermestes*. Gender masculine.

Diagnosis. As for the tribe.

Description. Length 7 mm; body elongate oval. Head transverse with converging subantennal, grooves, not extending beyond posterior edge of eyes. Eyes relatively large, sub-elliptical, with shallow emargination, strongly protruding. Gula broad, with distinct gular sutures. Antenna stout, 11-segmented with 4-segmented club; scape large, rectangular, about twice as wide as pedicel, antennomeres 3–7 gradually increasing in width; club relatively compact, apical antennomere semicircular. Mandibles not preserved. Ventral mouth parts not well preserved: mentum large, pentagonal with sides almost straight, anterior edge arcuate or acute; maxillary palps not preserved; terminal labial palpomere ovoid.

Pronotum transverse. Prosternum in front of coxae about as long as coxal cavity length; prosternal process complete and with median carina, parallel sided and apically rounded. Hypomeron slightly concave without antennal grooves or cavities; notosternal suture straight and complete. Procoxae weakly oval, not projecting with exposed protrochantin. Procoxal cavities externally broadly open with postcoxal lateral projections short. Prosternal process narrow but complete.

Scutellum not preserved. Elytral not preserved except for epipleura, which is narrow and incomplete apically, densely punctured, punctures bear short setae. Mesoventrite narrowly triangular, damaged anteriorly; posterior edge shallowly emarginate. Mesocoxa slightly excavate laterally with exposed trochantin; mesocoxal cavities open to mesepimeron, separated by half the diameter of mesocoxae. Metaventrite about twice as long as mesoventrite; discrimen present in basal half; metanepisterna very broad. Metacoxae narrowly separated medially, extending laterally beyond metaventrite to elytral edge; coxal plates developed at mesal half only.

Legs hind legs longer than fore- and mid legs; trochanters oblique, femora stout and widest at middle; tibiae longer than femora, narrow at base and widened at for most of length, bearing sparse short setae and 2 apical spurs. Tarsi simple; tarsomeres 1-4 subequal, tarsomere 5 slightly shorter than 1-4 combined, clothed with fine setae; pretarsal claw simple; bisetose empodium present.

Abdomen 0.8 times as long as wide, with five apparently freely articulated ventrites; ventrite 1 slightly longer than ventrite 2; intercoxal process well developed, narrowly rounded apically; ventrites 2–4

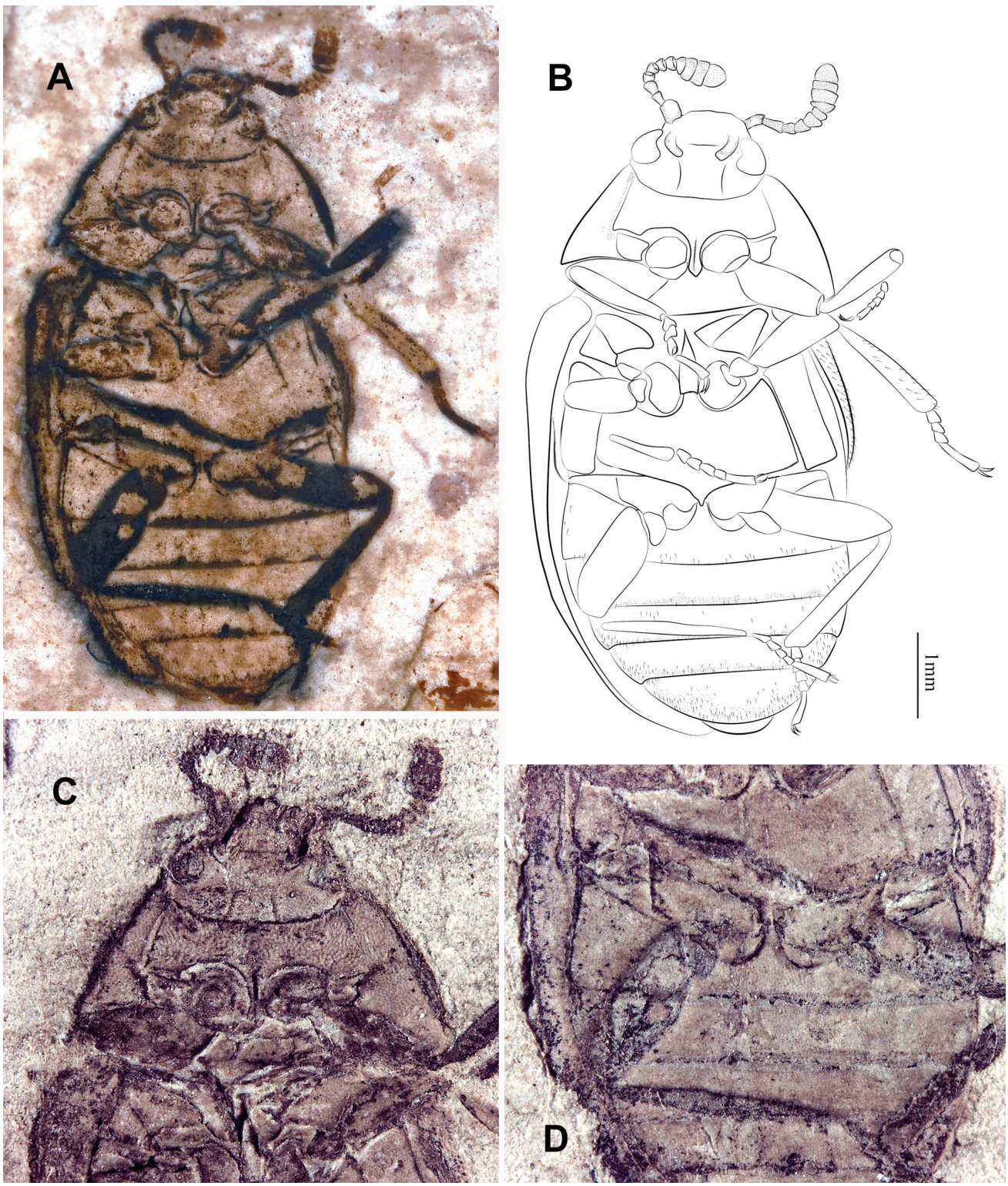

Figure 1. *Paradermestes jurassicus* sp. nov., holotype. (A) ventral aspect, complete specimen under ethanol; (B) interpretative drawing, ventral aspect; (C) anterior part of body, without ethanol; (D) hind coxae and abdomen, without ethanol.

subequal in length; ventrite 5 longer than ventrite 4, rounded apically.

Paradermestes jurassicus sp. nov.
(Fig. 1)

Diagnosis. As for the genus.

Etymology. The species name refers to the Jurassic period.

Holotype. CNU-COL-NN-2017001, single impression, preserving mostly ventral aspect, sex unknown; deposited in the Key Laboratory of Insect Evolution and Environmental Changes, College of Life Sciences, Capital Normal University (CNU), Beijing, China.

Description. Length 6.8 mm, width 3.6 mm; body twice as long as wide, widest at bases of elytra. Head transverse (width, including eyes 2.0 mm). Pronotum 0.6 times as long as wide; sides weakly rounded, posterior angles obtuse. Elytra visible laterally only, about 1.5 times as long as wide, and 2.9 times as long as pronotum; sides slightly arcuate, widest at base; humeral angle obtuse. Epipleura narrow and incomplete, densely punctured, bearing short setae.

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